

CLAIMS

What is claimed is:

1. A method for making a hollow fan blade including the steps of:
 - a. machining a plurality of continuous cavities on a first substrate to define a plurality of ribs adjacent the cavities, wherein said step of machining includes the step of simultaneously machining a floor and opposite interior wall surfaces of the cavities; and
 - b. abutting the plurality of ribs on the first substrate with a second substrate to form a hollow fan blade.
2. The method of claim 1 wherein said step a) is a 3-axis machining operation.
3. The method of claim 1 wherein the ribs formed in said step a) are tapered.
4. The method of claim 1 wherein each of the ribs is tapered to transition into a compound radius in an adjacent one of the cavities.
5. The method of claim 1 further including the step of forming a plurality of ribs on the second substrate and wherein said step b) further includes the step of abutting the ribs on the first substrate with the ribs on the second substrate.

6. The method of claim 1 wherein the plurality of ribs do not intersect one another.

7. The method of claim 6 wherein the plurality of ribs are each freestanding, such that they are not intersected by any other ribs between opposite ends.

8. The method of claim 7 wherein the plurality of ribs are parallel in a region adjacent a root edge.

9. The method of claim 1 wherein each of the cavities is formed in said step a) by no more than two machining passes.

10. The method of claim 1 wherein each of the cavities extends continuously from one edge of the substrate to another edge of the substrate.

11. The method of claim 10 wherein at least a first subset of the cavities extend continuously from a root edge of the substrate and curve to a leading edge of the substrate.

12. The method of claim 1 wherein said step a) further includes the step of machining each of the plurality of continuous cavities along a first path adjacent one of the plurality of ribs from a first end of the rib to a second end of the rib, then around the

second end of the rib and along a second path adjacent the rib at least substantially to the first end of the rib.

13. The method of claim 1 wherein said step a) further includes the step of machining a first continuous cavities along a first path adjacent a first rib of the plurality of ribs from a first end of the first rib to a second end of the first rib, then around the second end of the first rib and along a second path between the first rib and a second rib at least substantially to the first end of the first rib, then around a first end of the second rib and along a third path adjacent the second rib substantially to a second end of the second rib.

14. The method of claim 1 wherein at least a first subset of the plurality of continuous cavities form a single continuous serpentine path on either side of each of at least a first subset of the plurality of ribs.

15. A method for making a hollow fan blade including the steps of:
- a) machining a floor and opposite interior wall surfaces of a plurality of continuous cavities on a first substrate to define a plurality of ribs adjacent the cavities, wherein said step of machining is a three-axis machining operation; and
 - b) abutting the plurality of ribs on the first substrate with a second substrate to form a hollow fan blade.
16. The method of claim 15 wherein the floor and opposite interior wall surfaces are machined simultaneously for each of the plurality of cavities.
17. The method of claim 15 further including the steps of:
- c) bonding the ribs of the first substrate to ribs on the second substrate; and
 - d) forming the hollow fan blade into an airfoil shape.